EPA/ROD/R07-90/042
1990

EPA Superfund
Record of Decision:

SHENANDOAH STABLES
EPA ID: MOD980685838
OU 02
MOSCOW MILLS, MO
09/28/1990

09/28/90

SNLD
I. SITE NAME, LOCATION, AND DESCRIPTION

THE SHENANDOAH STABLES SITE IS LOCATED IN A RURAL AREA ALONG US HIGHWAY 61 NEAR MOSCOW MILLS, LINCOLN COUNTY, MISSOURI, APPROXIMATELY 45 MILES NORTHWEST OF ST. LOUIS, MISSOURI. SHENANDOAH STABLES LIES IN THE WEST ½, NORTHEAST 1/4 OF SECTION 17, TOWNSHIP 48N, RANGE 1E OF THE TROY 7.5 MINUTE USGS QUADRANGLE. THE PROPERTY LIES ON THE UPPER FLOOD PLAIN TERRACE OF CROOKED CREEK IN A PRIMARILY AGRICULTURAL AREA. THERE ARE A NUMBER OF SINGLE FAMILY RESIDENCES, A LIVESTOCK OPERATION AND OTHER SMALL BUSINESSES ON APPROXIMATELY 5- TO 10-ACRE PARCELS AROUND THE FACILITY. APPROXIMATELY NINE RESIDENCES ARE LOCATED WITHIN A QUARTER-MILE RADIUS OF THE SITE. THE PREDOMINANT LAND USE IS PASTURE LAND WHICH IS PRIMARILY VEGETATED WITH FESCUE.

THE PROPERTY INCLUDES AN ENCLOSED ARENA AND HORSE STABLES BUILDING CONTAINING A 78.5-FOOT BY 189-FOOT HORSE ARENA, AND NEARLY 100 BOARDING STALLS. THE ARENA STRUCTURE IS PRINCIPALLY A WOOD FRAME STRUCTURE WITH WOOD POLES AND TRUSSES AND SUPPORTS AND SHEET METAL WALLS. FIGURE 1 SHOWS A DIAGRAM OF THE SITE AS IT CURRENTLY EXISTS. THE PRESENCE OF DIOXIN (2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN) CONTAMINATION HAS BEEN IDENTIFIED AT THE SITE.

#SHEA
II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

SITE HISTORY

DURING THE EARLY 1970'S, ACTIVITIES AT SHENANDOAH STABLES INCLUDED THE BOARDING, TRAINING AND SALE OF HORSES, AND THE STAGING OF HORSE SHOWS. CHILDREN PERIODICALLY PLAYED IN THE ARENA BUILDING. THE AREA INSIDE THE ARENA WAS SPRAYED WITH DIOXIN-CONTAMINATED WASTE OIL ON MAY 26, 1971, FOR DUST CONTROL PURPOSES. IT HAS BEEN REPORTED THAT 1,500 GALLONS OF WASTE MATERIAL WERE APPLIED AT THIS TIME.

FOLLOWING THIS SPRAYING, A NUMBER OF ADVERSE EFFECTS WERE NOTED IN HORSES, OTHER ANIMALS, AND IN HUMANS. IN AUGUST OF 1971, THE FACILITY OWNER REPORTEDLY REMOVED 6 TO 8 INCHES OF THE CONTAMINATED ARENA SOIL. THIS MATERIAL WAS DISPOSED OF IN A FILL FOR A PORTION OF US HIGHWAY 61, WHICH WAS UNDER CONSTRUCTION AT THE TIME. HORSES CONTINUED TO DIE AFTER THE FIRST EXCAVATION EFFORT. IN MARCH 1972, AN ADDITIONAL 18 INCHES OF MATERIALS WERE REPORTEDLY REMOVED BY THE SITE OWNER FROM THE ARENA AREA AND BURIED ONSITE IN A SLOUGH AREA ABOUT 75 FEET SOUTHEAST OF THE ARENA STRUCTURE.

SINCE THE INITIAL SITE SAMPLING EFFORT IN MAY, 1982 CONFIRMED THE PRESENCE OF DIOXIN AT THIS SITE, A TOTAL OF FOUR SITE INVESTIGATIONS HAVE BEEN CONDUCTED BY THE EPA AND ONE BY THE US FISH AND WILDLIFE SERVICE (USFWS). THESE INVESTIGATIONS DETECTED EXTERIOR CONTAMINATION OF THE FACILITY BY DIOXIN AT LEVELS GREATER THAN 1750 PARTS PER BILLION (PPB). DIOXIN CONTAMINATION HAD SPREAD FROM THE ORIGINAL SPRAYED AREA TO ADJOINING PORTIONS OF THE ENCLOSED FACILITY AND TO OUTSIDE AREAS. SAMPLING AND ANALYSIS CONFIRMED CONTAMINATION OF APPROXIMATELY 8600 SQUARE YARDS OF INTERIOR AND EXTERIOR SITE AREAS. IN ADDITION, THE USFWS SAMPLING IDENTIFIED DIOXIN CONTAMINATION IN AREA WILDLIFE AS HIGH AS 46 PICOGRAMS/GRAM.

A RECORD OF DECISION (ROD) FOR THE SHENANDOAH STABLES SITE WAS ISSUED BY EPA ON JULY 28, 1988. THIS ROD SELECTED A REMEDIAL ACTION INVOLVING EXCAVATION AND INTERIM ONSITE STORAGE OF DIOXIN-CONTAMINATED SOILS EXCEEDING HEALTH-BASED LEVELS RECOMMENDED BY FEDERAL AND STATE HEALTH AGENCIES. EXCAVATION CONTINUED UNTIL A RESIDUAL CONCENTRATION OF ONE PART PER BILLION (PPB) WAS REACHED IN AREAS OUTSIDE THE ARENA, AND UNTIL A RESIDUAL CONCENTRATION OF FIVE TO TEN PPB WAS REACHED AT A DEPTH GREATER THAN TWO FEET IN THE ARENA AND SLOUGH AREAS. DURING THIS REMEDIAL ACTION, DECONTAMINATION OF THE ARENA BUILDING WAS PERFORMED TO MEET HEALTH AGENCY RECOMMENDATIONS. IMPLEMENTATION OF THIS REMEDIAL ACTION WAS COMPLETED IN MAY, 1989. A TOTAL OF APPROXIMATELY 3,471 CUBIC YARDS OF DIOXIN-CONTAMINATED MATERIALS RESULTING FROM SOIL EXCAVATION AND BUILDING DECONTAMINATION ARE CURRENTLY IN INTERIM ONSITE STORAGE INSIDE FULLY ENCLOSED WOOD-FRAMED, STEEL SIDED STORAGE STRUCTURES PENDING FINAL MANAGEMENT.

ADDITIONAL INFORMATION ABOUT THE SITE, THE HISTORY OF CONTAMINATION, AND THE INVESTIGATIONS THAT EPA HAS CONDUCTED IS PRESENTED IN THE FEASIBILITY STUDIES AND OTHER DOCUMENTS IN THE ADMINISTRATIVE RECORD.

ENFORCEMENT

THE POTENTIALLY RESPONSIBLE PARTIES (PRPS) FOR THIS SITE (AND THE OTHER MISSOURI DIOXIN SITES WHICH ARE THE SUBJECT OF PENDING LITIGATION) INCLUDE THE GENERATORS OF THE DIOXIN WASTE, THE TRANSPORTER OF THE WASTE, AND THOSE WHO ARRANGED FOR THE TRANSPORT AND SPRAYING OF THE WASTE.

ON APRIL 30, 1983, AN ADMINISTRATIVE ORDER PURSUANT TO SECTION 106 OF CERCLA WAS ISSUED TO THE OWNER OF THE SHENANDOAH STABLES ARENA REQUIRING CLOSURE OF THE ARENA AND STABLES BUILDING AND RESTRICTING ACCESS TO THE PROPERTY. SUBSEQUENT COMPLIANCE INSPECTIONS CONDUCTED BY EPA CONFIRMED THAT COMPLIANCE WITH THE ADMINISTRATIVE ORDER HAD BEEN OBTAINED.

SPECIAL NOTICE LETTERS WERE ISSUED TO THE SYNTEX DEFENDANTS AND TO INDEPENDENT PETROCHEMICAL CORPORATION ON MARCH 31, 1988. THE MORATORIUM REQUIRED BY SECTION 122(E) OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) BEGAN ON THE DATE OF ISSUANCE OF THIS NOTICE.

THIS SITE IS ONE OF THE SIX DIOXIN SITES ORIGINALLY INCLUDED IN THE US V. BLISS. ET AL, COMPLAINT, CIVIL ACTION NO. 84-200 C (1), WHICH WAS FILED IN THE FEDERAL DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI ON JANUARY 20, 1984. ON MARCH 1, 1989, 21 ADDITIONAL SITES IN EASTERN MISSOURI WHICH BECAME CONTAMINATED BY DIOXIN THROUGH SIMILAR MEANS WERE ADDED TO THIS LITIGATION (CIVIL ACTION NOS. 89-351 C (1) THROUGH 89-571 C(1)). THE CASES WERE CONSOLIDATED WITH THE ORIGINAL CASE FOR DISCOVERY AND TRIAL. ON APRIL 6, 1990, THE UNITED STATES COMMENCED CIVIL ACTION NO. 90-656C(1) WHICH HAS BEEN CONSOLIDATED WITH THE OTHER CIVIL ACTIONS REFERENCED IN THIS PARAGRAPH.

THE PLEADINGS IN THE ABOVE LITIGATION REFER TO 28 SITES, WHILE EPA'S TECHNICAL DOCUMENTS SOMETIMES REFER TO 27 SITES. THE DISCREPANCY IN NUMBERS IS DUE TO A DIFFERENCE IN NOMENCLATURE USED BY EPA AND THE DEPARTMENT OF JUSTICE. THE SAME GROUP OF DESIGNATED SITES ARE REPRESENTED BY BOTH LISTS.

PARTIAL SUMMARY JUDGMENT PURSUANT TO SECTION 107 OF CERCLA HAS BEEN GRANTED AS TO THE BLISS, NORTHEASTERN PHARMACEUTICAL AND CHEMICAL COMPANY (NEPACCO) AND INDEPENDENT PETROCHEMICAL COMPANY (IPC) DEFENDANTS.

ON JULY 20, 1990, A CONSENT DECREE WAS LODGED WITH THE COURT WITH THE UNITED STATES OF AMERICA, THE STATE OF MISSOURI, AND THE NAMED SYNTEX DEFENDANTS AS SIGNATORIES. THIS CONSENT DECREE MAKES POSSIBLE A FINAL COMPREHENSIVE REMEDY FOR THE EASTERN MISSOURI DIOXIN SITES REFERENCED IN THE ABOVE CIVIL ACTIONS. THE REMEDY SPECIFIED BY THE CONSENT DECREE IS CONSISTENT WITH THE TIMES BEACH ROD, AND PROVIDES THERMAL TREATMENT CAPACITY AT TIMES BEACH FOR ALL DESIGNATED EASTERN MISSOURI DIOXIN SITES, INCLUDING THE SHENANDOAH STABLES SITE. A PUBLIC COMMENT PERIOD WAS CONDUCTED FOR THIS CONSENT DECREE FROM AUGUST 8, 1990, THROUGH SEPTEMBER 7, 1990.

A CONSENT DECREE BETWEEN THE UNITED STATES OF AMERICA, THE STATE OF MISSOURI, AND THE NEPACCO DEFENDANTS WAS LODGED ON JULY 26, 1990. THE NEPACCO CONSENT DECREE PROVIDES FOR CASH SETTLEMENT OF THE LIABILITY OF THE NEPACCO DEFENDANTS. A PUBLIC COMMENT PERIOD WAS CONDUCTED FOR THE NEPACCO CONSENT DECREE FROM AUGUST 8, 1990, THROUGH SEPTEMBER 7, 1990.

#CRH
III. COMMUNITY RELATIONS HISTORY

THE PUBLIC WAS FIRST INVITED TO COMMENT ON THE CONCEPT OF A COMPREHENSIVE SOLUTION FOR ALL OF THE EASTERN MISSOURI DIOXIN SITES AT THE SEPTEMBER 5, 1986, PUBLIC MEETING FOR THE MINKER/STOUT/ROMAINE CREEK (M/S/RC) FEASIBILITY STUDY. AT THAT MEETING, IT WAS ANNOUNCED THAT THE STATE OF MISSOURI HAD RECOMMENDED EVALUATION OF TIMES BEACH AS A LOCATION FOR SITING A TEMPORARY THERMAL TREATMENT UNIT AND THAT EPA WAS EVALUATING THIS POSSIBILITY. A FEASIBILITY STUDY TO EVALUATE TIMES BEACH AS A POTENTIAL LOCATION FOR CENTRALIZED THERMAL

TREATMENT OF DESIGNATED EASTERN MISSOURI DIOXIN SITES WAS TO BE COMPLETED AND RELEASED FOR PUBLIC COMMENT.

THE TIMES BEACH FEASIBILITY STUDY WAS RELEASED FOR PUBLIC COMMENT FROM DECEMBER 29, 1986, THROUGH MARCH 27, 1987. A PUBLIC MEETING WAS HELD ON FEBRUARY 12, 1987, TO DISCUSS ALTERNATIVES EVALUATED IN THE STUDY AND TO PRESENT THE AGENCY'S PROPOSED REMEDY.

THE PROPOSED PLAN FOR TIMES BEACH AND THE M/S/RC SITES WAS RELEASED FEBRUARY 19, 1988. A PUBLIC COMMENT PERIOD WAS HELD FROM FEBRUARY 19 THROUGH MARCH 18, 1988, AND A PUBLIC MEETING WAS HELD IN EUREKA, MISSOURI MARCH 10, 1988. A RECORD OF DECISION WAS ISSUED BY EPA ON SEPTEMBER 29, 1988, SELECTING A REMEDY INVOLVING CENTRALIZED THERMAL TREATMENT OF DIOXIN-CONTAMINATED MATERIALS AT TIMES BEACH. THIS RECORD OF DECISION ESTABLISHED THAT DIOXIN-CONTAMINATED MATERIALS FROM A DESIGNATED GROUP OF EASTERN MISSOURI SITES, INCLUDING THE SHENANDOAH STABLES SITE, COULD BE TRANSPORTED TO TIMES BEACH FOR THERMAL TREATMENT.

ON AUGUST 24, 1990, THE EPA RELEASED THE PROPOSED PLAN FOR FINAL MANAGEMENT OF DIOXIN-CONTAMINATED SOIL, SHENANDOAH STABLES, MOSCOW MILLS, MISSOURI. THIS PROPOSED PLAN PRESENTED THE EPA'S PREFERRED REMEDY INVOLVING TRANSPORTATION OF DIOXIN-CONTAMINATED MATERIALS CURRENTLY IN STORAGE AT THE SHENANDOAH STABLES SITE TO TIMES BEACH FOR THERMAL TREATMENT USING THE TEMPORARY THERMAL TREATMENT UNIT ESTABLISHED BY THE SEPTEMBER 29, 1988 TIMES BEACH RECORD OF DECISION. A PUBLIC MEETING TO DISCUSS THE SHENANDOAH STABLES PROPOSED PLAN WAS CONDUCTED ON SEPTEMBER 19, 1990, AT THE MOSCOW MILLS COMMUNITY CENTER. PUBLIC COMMENTS WERE ACCEPTED BY THE AGENCY THROUGH SEPTEMBER 24, 1990. A RESPONSIVENESS SUMMARY HAS BEEN PREPARED WHICH ADDRESSES ALL COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD FOR THE SHENANDOAH STABLES PROPOSED PLAN.

THE DOCUMENTS DESCRIBED ABOVE ARE INCLUDED IN THE ADMINISTRATIVE RECORD AND CAN BE REFERRED TO FOR ADDITIONAL INFORMATION ON PUBLIC PARTICIPATION AND RESPONSE TO PREVIOUS ACTIVITIES.

#SRRA
IV. SCOPE AND ROLE OF RESPONSE ACTION

THE OVERALL REMEDY FOR THE SHENANDOAH STABLES SITE IS BEING PERFORMED IN TWO OPERABLE UNITS. THESE OPERABLE UNITS ARE INTENDED TO ADDRESS THE RISKS ASSOCIATED WITH THE HAZARDOUS SUBSTANCES AT THE SITE.

THE FIRST OPERABLE UNIT, WHICH WAS COMPLETED IN MAY, 1989, CONSISTED OF EXCAVATION AND INTERIM ONSITE STORAGE OF DIOXIN-CONTAMINATED SOILS EXCEEDING HEALTH-BASED LEVELS AND DECONTAMINATION OF THE ARENA STRUCTURE. CONTAMINATED MATERIALS WERE EXCAVATED AND PLACED IN POLYETHYLENE-LINED, POLYPROPYLENE CONTAINERS. EACH CONTAINER HOLDS APPROXIMATELY 1.3 CUBIC YARDS OF DIOXIN-CONTAMINATED MATERIALS. A TOTAL OF 2660 SUCH CONTAINERS WERE FILLED AND PLACED IN STORAGE DURING THE REMEDIAL ACTION.

THE CONTAINERIZED WASTES ARE CURRENTLY IN INTERIM ONSITE STORAGE INSIDE THREE WOOD-FRAMED, STEEL SIDED STORAGE STRUCTURES WITH BERMED CONCRETE FLOORS. THESE BUILDINGS WERE CONSTRUCTED AT TWO SEPARATE LOCATIONS NEAR THE ARENA BUILDINGS. EACH COMPOUND IS SURROUNDED BY A SIX-FOOT CHAIN LINK SECURITY FENCE. BOTH THE FENCES AND BUILDINGS ARE LOCKED AT ALL TIMES.

THIS RECORD OF DECISION SELECTS THE REMEDY FOR THE SECOND OPERABLE UNIT, WHICH ADDRESSES FINAL MANAGEMENT OF DIOXIN-CONTAMINATED MATERIALS CURRENTLY IN INTERIM STORAGE ONSITE.

#SC
V. SITE CHARACTERISTICS

DIOXIN (2,3,7,8 TETRACHLORODIBENZO-P-DIOXIN) IS THE ONLY CONTAMINANT IDENTIFIED AT THE SITE WHICH EXCEEDS HEALTH-BASED LEVELS. PRIOR TO IMPLEMENTATION OF THE FIRST OPERABLE UNIT RESPONSE ACTION, CONTAMINATION EXISTED AT THE SITE BOTH INSIDE AND OUTSIDE OF THE ARENA BUILDING. INTERIOR CONTAMINATION INCLUDED SURFACE SOILS AND CONTAMINATED DUST LOCATED ON INTERIOR SURFACES. EXTERIOR CONTAMINATION WAS LIMITED TO SURFACE SOILS IN CLOSE PROXIMITY OF THE ARENA AND SUBSURFACE SOILS IN THE SLOUGH AREA. DIOXIN CONTAMINATION OF THE SLOUGH AREA

EXTENDED TO A DEPTH OF FOUR FEET WITH LEVELS AS HIGH AS 1730 PARTS PER BILLION. NO CONTAMINATION WAS IDENTIFIED IN SURFACE WATERS RECEIVING DRAINAGE FROM THE SITE. BONDING OF DIOXIN TO SURFACE SOILS PREVENTED GROUND WATER CONTAMINATION FROM OCCURRING.

DURING IMPLEMENTATION OF THE FIRST OPERABLE UNIT RESPONSE ACTION, INTERIOR AND EXTERIOR SURFACE SOILS EXCEEDING HEALTH-BASED LEVELS WERE EXCAVATED, CONTAINERIZED, AND PLACED IN SECURE STORAGE. INTERIOR SURFACES OF THE ARENA BUILDING WERE EITHER DECONTAMINATED, OR REMOVED, CONTAINERIZED, AND PLACED IN SECURE ONSITE STORAGE. PORTIONS OF THE BUILDING INTERIOR THAT WERE REMOVED WERE REPLACED WITH CLEAN MATERIALS.

ALL CONTAMINANTS IDENTIFIED AT THE SITE HAVE BEEN CONTAINERIZED AND PLACED IN INTERIM ONSITE STORAGE. A TOTAL OF 3,471 CUBIC YARDS OF CONTAMINATED MATERIALS ARE CURRENTLY IN STORAGE IN THE THREE TEMPORARY STORAGE BUILDINGS CONSTRUCTED AT THE SITE. THE STORAGE STRUCTURES COMPLY WITH ALL SUBSTANTIVE REQUIREMENTS OF THE RESOURCE CONSERVATION AND RECOVERY ACT FOR THE STORAGE OF HAZARDOUS MATERIALS.

#SR
VI. SITE RISKS

CONTAMINANTS OF CONCERN

DIOXIN (2,3,7,8 TETRACHLORODIBENZO-P-DIOXIN) IS THE ONLY CONTAMINANT IDENTIFIED AT THE SITE WHICH EXCEEDS HEALTH-BASED LEVELS. DIOXIN IS CONSIDERED ONE OF THE MOST TOXIC COMPOUNDS YET IDENTIFIED. ALTHOUGH DIOXIN HAS BEEN HIGHLY TOXIC IN ALL SPECIES TESTED, THERE ARE LARGE SPECIES DIFFERENCES IN SENSITIVITY.

TOXICITY ASSESSMENT

ANIMAL STUDIES HAVE DEMONSTRATED THAT DIOXIN IS TERATOGENIC (CAUSES MALFORMITIES) AND FETOTOXIC (TOXIC TO FETUS) IN MICE, RATS, RABBITS, AND FERRETS. SINCE EXPOSURE TO DIOXIN PRODUCED STATISTICALLY SIGNIFICANT INCREASED INCIDENTS OF TUMORS IN ANIMAL SPECIES, EPA HAS DETERMINED THAT THERE IS SUFFICIENT EVIDENCE TO CONCLUDE THAT DIOXIN IS AN ANIMAL CARCINOGEN. IN FACT, DIOXIN IS THE MOST POTENT ANIMAL CARCINOGEN EVALUATED TO DATE BY THE EPA CARCINOGEN ASSESSMENT GROUP.

CONSIDERING THE AVAILABLE ANIMAL CARCINOGENIC AND EPIDEMIOLOGIC DATA, THE OVERALL WEIGHT-OF-EVIDENCE CLASSIFICATION CATEGORIZES DIOXIN (USING EPA'S INTERIM CLASSIFICATION SCHEME) AS A PROBABLE HUMAN CARCINOGEN.

DIOXIN WILL ADSORB TIGHTLY TO ORGANIC MATERIAL IN SOIL, RESULTING IN LOW MOBILITY. ONCE IN THE SOIL, DEGRADATION PROCESSES TEND TO BE VERY SLOW, WITH HALF LIVES ESTIMATED TO BE GREATER THAN TEN YEARS.

EXPERIMENTAL RESULTS SHOW THAT DIOXIN WILL ACCUMULATE AND CONCENTRATE IN FISH AND WILDLIFE. IN MAMMALS, DIOXIN IS READILY ABSORBED THROUGH THE GASTROINTESTINAL TRACT. ABSORPTION THROUGH SKIN HAS ALSO BEEN REPORTED. ABSORPTION MAY DECREASE DRAMATICALLY IF DIOXIN IS ADSORBED TO PARTICULATE MATTER SUCH AS ACTIVATED CARBON OR SOIL. AFTER ABSORPTION, DIOXIN IS DISTRIBUTED TO TISSUES WHICH ARE HIGH IN LIPID CONTENT; HOWEVER, IN MANY SPECIES THE LIVER IS A MAJOR STORAGE AREA FOR DIOXIN. METABOLISM OF DIOXIN OCCURS SLOWLY, WITH METABOLIZED DIOXIN EXCRETED IN THE URINE AND FECES. UNMETABOLIZED DIOXIN CAN BE ELIMINATED IN THE FECES.

RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

LONG-TERM POTENTIAL FOR DIRECT CONTACT WITH SOILS WAS CONTROLLED BY THE FIRST OPERABLE UNIT WHICH INVOLVED CONTAINERIZATION AND SECURE ONSITE STORAGE OF CONTAMINATED MATERIALS. THE PRINCIPAL CURRENT CONCERN WOULD BE FOR INTRUDERS WHO MAY DISTURB CONTAMINATED SOILS, OR FAILURE OF THE INTERIM STORAGE SYSTEM. IN THESE EVENTS, INGESTION OF SOILS OR INHALATION OF PARTICULATES CONTAMINATED WITH DIOXIN PRESENT THE GREATEST THREAT TO HUMAN HEALTH. WILDLIFE (DEER, TURKEY, RABBITS) ENTERING THE SITE AREA COULD BE SUSCEPTIBLE TO CONTAMINATION IN THE EVENT OF FAILURE OF THE STORAGE SYSTEM.

THE SITE LIES IN THE UPPER FLOODPLAIN OF CROOKED CREEK. IN THE EVENT OF STORAGE SYSTEM FAILURE, A POTENTIAL EXISTS FOR SURFACE CONTAMINATION TO REACH CROOKED CREEK VIA STORMWATER. FLOODING OF CROOKED CREEK COULD ALSO CAUSE DAMAGE TO THE STORAGE FACILITIES.

DURING THE PREVIOUS RESPONSE ACTION, CONTAMINATED SOILS EXCEEDING HEALTH-BASED LEVELS WERE EXCAVATED AND PLACED IN INTERIM ONSITE STORAGE. THESE HEALTH-BASED CLEANUP LEVELS WERE BASED UPON RECOMMENDATIONS FROM FEDERAL AND STATE HEALTH AGENCIES.

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY THE PREFERRED ALTERNATIVE, OR ONE OF THE OTHER ACTIVE MEASURES CONSIDERED, MAY PRESENT A CURRENT OR POTENTIAL THREAT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT.

#DA

VII. DESCRIPTION OF ALTERNATIVES

THE EPA EVALUATED THREE ALTERNATIVES FOR THE FINAL MANAGEMENT OF STORED DIOXIN-CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE. FURTHER DISCUSSION CONCERNING THE PREVIOUS RESPONSE ACTION AND THE ONE PART PER BILLION CLEANUP LEVEL CONTAINED IN THE JULY 28, 1988 SHENANDOAH STABLES ROD. THE FINAL REMEDIAL ALTERNATIVES CONSIDERED DURING THIS EVALUATION WERE 1) NO ACTION, 2) CONTINUED ONSITE STORAGE, AND 3) THERMAL TREATMENT AT TIMES BEACH. A DESCRIPTION OF THE ALTERNATIVES IS PROVIDED BELOW.

ALTERNATIVE 1 -- NO ACTION

EVALUATION OF THE NO-ACTION ALTERNATIVE IS REQUIRED IN THE REMEDY SELECTION PROCESS BY THE NATIONAL CONTINGENCY PLAN. UNDER THE NO-ACTION ALTERNATIVE, NO ADDITIONAL REMEDIAL ACTIONS WOULD BE TAKEN AT THE SITE. MAINTENANCE OF THE STORAGE FACILITIES, INCLUDING THE STRUCTURES, CONTAINERS, AND FENCING, WOULD NOT BE PROVIDED.

THIS ALTERNATIVE HAS NO ADDITIONAL CAPITAL OR OPERATION AND MAINTENANCE COSTS. STORAGE REQUIREMENTS FOR HAZARDOUS WASTES UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND THE MISSOURI HAZARDOUS WASTE MANAGEMENT LAW (HWML), WOULD NOT BE ATTAINED IF NO FURTHER ACTION IS TAKEN AT THE SITE. THIS ALTERNATIVE IS NOT PROTECTIVE.

ALTERNATIVE 2 -- CONTINUED OPERATION AND MAINTENANCE OF ONSITE STORAGE

THIS ALTERNATIVE INVOLVES CONTINUED ONSITE STORAGE OF CONTAMINATED MATERIALS PENDING FINAL MANAGEMENT. THE STORAGE FACILITIES WERE NOT DESIGNED AND CONSTRUCTED FOR THE PURPOSE OF PROVIDING PERMANENT STORAGE. CONTINUED OPERATION AND MAINTENANCE OF THE STORAGE FACILITIES WOULD BE PROVIDED TO MINIMIZE THE POTENTIAL FOR FUTURE RELEASE OF CONTAMINANTS.

THE ESTIMATED TEN-YEAR OPERATION AND MAINTENANCE BUDGET FOR CONTINUED STORAGE OF CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE IS $202,426. MAJOR REPAIR OR REPLACEMENT OF THE STORAGE STRUCTURES WOULD BE REQUIRED AS THE DESIGN LIFE IS MET OR EXCEEDED. THE INTEGRITY OF THE STORAGE CONTAINERS WOULD DIMINISH WITH TIME, INCREASING FUTURE MATERIAL HANDLING COSTS. NO IMMEDIATE CAPITAL COSTS ARE ASSOCIATED WITH THIS REMEDY.

THE PRIMARY ARARS PERTAINING TO THIS ALTERNATIVE ARE RCRA AND MISSOURI HWML STORAGE REQUIREMENTS FOR HAZARDOUS WASTES. MAINTENANCE OF THE STORAGE FACILITIES AND PERIODIC INSPECTIONS WOULD BE PROVIDED IN ORDER TO MEET THESE REQUIREMENTS. THIS ALTERNATIVE WOULD BE IN COMPLIANCE WITH ALL OTHER IDENTIFIED ARARS.

ALTERNATIVE 3 -- THERMAL TREATMENT AT TIMES BEACH

THIS ALTERNATIVE INVOLVES LOADING AND TRANSPORTATION TO TIMES BEACH OF 3,471 CUBIC YARDS OF STORED DIOXIN-CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE. AT TIMES BEACH, CONTAMINATED MATERIALS WOULD BE TREATED USING A TEMPORARY THERMAL TREATMENT UNIT WHICH IS AVAILABLE TO TREAT CONTAMINATED MATERIALS FROM A DESIGNATED GROUP OF EASTERN MISSOURI DIOXIN SITES. THESE DESIGNATED SITES ARE SPECIFIED IN THE SEPTEMBER 29, 1988, TIMES BEACH RECORD OF DECISION AND JULY 18, 1990 EXPLANATION OF SIGNIFICANT DIFFERENCES FOR THE TIMES BEACH SITE.

RESIDUES FROM THE THERMAL TREATMENT OF DIOXIN-CONTAMINATED MATERIALS WILL BE DISPOSED AS NON-HAZARDOUS SOLID WASTE IF RCRA DELISTING CRITERIA ARE ACHIEVED. RESIDUES FAILING TO MEET DELISTING CRITERIA WILL BE RETREATED OR DISPOSED OF AS HAZARDOUS WASTE AFTER MEETING RCRA LAND DISPOSAL RESTRICTIONS (40 CFR PART 268). FOLLOWING THERMAL TREATMENT OF DIOXIN-CONTAMINATED MATERIALS FROM THE DESIGNATED EASTERN MISSOURI SITES, THE TEMPORARY THERMAL TREATMENT UNIT WILL BE PERMANENTLY REMOVED FROM TIMES BEACH.

THE THREE STORAGE STRUCTURES AT THE SHENANDOAH STABLES SITE WHERE CONTAMINATED MATERIALS ARE BEING STORED WOULD BE DECONTAMINATED FOLLOWING REMOVAL OF ALL STORED MATERIALS. FOR THE PURPOSE OF THIS ANALYSIS, IT IS ASSUMED THAT THE THREE STORAGE STRUCTURES WILL BE DISMANTLED AND REMOVED FROM THE SHENANDOAH STABLES SITE FOLLOWING DECONTAMINATION. THE DISTURBED PORTIONS OF THE SITE WILL BE GRADED AND REVEGETATED. HOWEVER, AS A CONDITION OF ACCESS, THE SITE OWNER MAY ELECT TO RETAIN THE DECONTAMINATED BUILDINGS ON THE PROPERTY.

THE TOTAL CAPITAL COST ASSOCIATED WITH IMPLEMENTATION OF THIS REMEDY IS $2.8 MILLION. UPON COMPLETION, ALL CONTAMINANTS EXCEEDING HEALTH-BASED LEVELS WILL HAVE BEEN REMOVED OR DESTROYED. NO OPERATION AND MAINTENANCE ACTIVITIES WILL BE NECESSARY. SINCE ALL CONTAMINANTS EXCEEDING HEALTH-BASED LEVELS WOULD BE REMOVED FROM THE SITE AND THERMALLY DESTROYED, A FIVE-YEAR REVIEW, PURSUANT TO SECTION 121 OF CERCLA, WOULD NOT BE REQUIRED.

THE PRIMARY ARARS ASSOCIATED WITH THIS ALTERNATIVE CONSIST OF TRANSPORTATION, STORAGE, AND THERMAL TREATMENT REQUIREMENTS UNDER RCRA AND HWML, EMISSIONS REQUIREMENTS FOR THE THERMAL TREATMENT UNIT AT TIMES BEACH UNDER THE CLEAN AIR ACT, MISSOURI SOLID WASTE MANAGEMENT REGULATIONS, DEPARTMENT OF TRANSPORTATION REQUIREMENTS, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REQUIREMENTS FOR WORKER PROTECTION, AND POTENTIALLY NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM REQUIREMENTS UNDER THE CLEAN WATER ACT, DEPENDING UPON SYSTEM DESIGN. THIS ALTERNATIVE CAN BE IMPLEMENTED IN COMPLIANCE WITH ALL IDENTIFIED ARARS. THE TIME TO IMPLEMENT THIS ALTERNATIVE IS DEPENDENT UPON THE OPERATION SCHEDULE OF THE TEMPORARY THERMAL TREATMENT UNIT AT TIMES BEACH.

IT IS ANTICIPATED THAT TRANSPORT AND TREATMENT OF 3471 CUBIC YARDS OF CONTAMINATED SOILS AT THE SITE COULD BE COMPLETED WITHIN TWO MONTHS DURING THE SIX-YEAR TIMES BEACH PROJECT PERIOD ASSUMED IN THE TIMES BEACH RECORD OF DECISION. THE ACTUAL DURATION OF THE PROJECT AT TIMES BEACH WILL BE CONTROLLED BY THE OPERATING RATE OF THE TEMPORARY THERMAL TREATMENT UNIT. THE TRANSPORT AND TREATMENT OF MATERIALS FROM THE SHENANDOAH STABLES SITE WILL BE PRIORITIZED WITH THE OTHER EASTERN MISSOURI DIOXIN SITE MATERIALS, AND COULD BE SCHEDULED AT ANY TIME DURING THE OPERATION OF THE THERMAL TREATMENT UNIT.

#CAA

VIII. COMPARATIVE ANALYSIS OF ALTERNATIVES

THE THREE ALTERNATIVES DESCRIBED ABOVE WERE EVALUATED USING CRITERIA PRESENTED IN NATIONAL CONTINGENCY PLAN. THESE CRITERIA RELATE DIRECTLY TO FACTORS MANDATED BY SECTION 121 OF CERCLA, AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986, AND CONSIDERATIONS WHICH MEASURE THE OVERALL FEASIBILITY AND ACCEPTABILITY OF THE REMEDY.

THE EVALUATION CRITERIA INCLUDE THRESHOLD CRITERIA OF OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, AND COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS), PRIMARY BALANCING CRITERIA OF LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT, SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, AND COST, AND MODIFYING CRITERIA OF STATE ACCEPTANCE AND COMMUNITY ACCEPTANCE. THESE EVALUATIONS ARE SUMMARIZED BELOW.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS THE CENTRAL MANDATE OF CERCLA, AS AMENDED BY SARA. PROTECTION IS ACHIEVED BY REDUCING RISKS TO ACCEPTABLE LEVELS AND TAKING ACTION TO ENSURE THAT THERE WILL BE NO FUTURE UNACCEPTABLE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT THROUGH ANY EXPOSURE PATHWAY.

ALTERNATIVE 3, INVOLVING THERMAL TREATMENT, PROVIDES THE HIGHEST OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THE OFFICE OF SOLID WASTE HAS IDENTIFIED THERMAL TREATMENT AS THE BEST DEMONSTRATED AVAILABLE TECHNOLOGY FOR DIOXIN DESTRUCTION. SHORT-TERM RISKS DURING THERMAL TREATMENT OPERATION ASSOCIATED WITH EMISSIONS ARE CONTROLLED THROUGH CONTINUOUS PROCESS AND EMISSIONS MONITORING AND REDUNDANT SAFETY FEATURES. THE THERMAL TREATMENT UNIT WILL BE EQUIPPED WITH EMERGENCY SHUTDOWN SYSTEMS WHICH ACTIVATE IF PERMIT-CONTROLLED PROCESS CRITERIA ARE VIOLATED, THEREBY CONTROLLING THE POTENTIAL FOR RELEASE OF HAZARDOUS SUBSTANCES DUE TO INCINERATOR UPSETS.

EPA HAS CONSIDERED THE RISKS ASSOCIATED WITH TRANSPORTATION OF THE DIOXIN-CONTAMINATED MATERIALS TO TIMES BEACH FOR THERMAL TREATMENT, AND DETERMINED THAT THE TRANSPORTATION OF THESE MATERIALS TO TIMES BEACH DOES NOT REPRESENT A SIGNIFICANT RISK. THE CONTAMINATED MATERIALS ARE RELATIVELY IMMOBILE IN THE ENVIRONMENT. ANY SPILL OF CONTAMINATED MATERIALS DURING TRANSPORT COULD BE IMMEDIATELY AND EFFECTIVELY CLEANED UP AND REMOVED. TRANSPORTATION RISKS WILL BE FURTHER REDUCED BY DESIGNATING HAUL ROUTES WHICH AVOID POPULATION CENTERS TO THE EXTENT POSSIBLE. FURTHER, THE CONTAMINATED SOILS, WHICH ARE CONTAINERIZED IN STORAGE BAGS, WILL BE HAULED IN LINED TRUCK BEDS. THE TRUCK BED LINER WILL BE GATHERED AND SECURED ABOVE THE CONTAMINATED SOILS, AND COVERED WITH A TARP WHICH WILL BE TIGHTLY FASTENED TO THE EXTERIOR BED WALLS.

ALTERNATIVE 1, NO ACTION, WOULD NOT PROVIDE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. WITHOUT CONTINUED MAINTENANCE, THE STORAGE SYSTEMS WOULD EVENTUALLY FAIL, RESULTING IN THE RELEASE OF DIOXIN-CONTAMINATED MATERIALS TO THE ENVIRONMENT. ALTERNATIVE 2, CONTINUED OPERATION AND MAINTENANCE, WOULD PROVIDE GREATER OVERALL PROTECTION THAN NO ACTION, BUT THE POTENTIAL FOR CATASTROPHIC FAILURE (FLOOD, EARTHQUAKE, ETC.) OF THE STORAGE FACILITY WOULD REMAIN AT CURRENT LEVELS OR INCREASE AS STORAGE SYSTEMS DETERIORATE.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

SECTION 121(D) OF CERCLA, AS AMENDED BY SARA, REQUIRES THAT REMEDIAL ACTIONS COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS.

CERCLA SECTION 104(D)(4) AND CERCLA POLICY ALLOWS EPA TO TREAT TWO OR MORE NON-CONTIGUOUS FACILITIES AS ONE SITE, WHERE THE FACILITIES ARE REASONABLY RELATED ON THE BASIS OF EITHER GEOGRAPHY OR THE THREAT POSED TO HUMAN HEALTH AND THE ENVIRONMENT. EPA HAS DETERMINED THAT THE EASTERN MISSOURI DIOXIN SITES DESIGNATED ABOVE ARE RELATED BASED ON THE THREAT POSED, AND SHOULD BE TREATED AS ONE SITE FOR RESPONSE PURPOSES. EPA HAS ALSO DETERMINED THAT A COMBINED RESPONSE ACTION FOR EASTERN MISSOURI DIOXIN SITES WILL BE COST-EFFECTIVE AND PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ACCORDINGLY, THE THERMAL TREATMENT AT TIMES BEACH OF DIOXIN-CONTAMINATED MATERIALS FROM THE DESIGNATED LOCATIONS, INCLUDING SHENANDOAH STABLES, IS CONSIDERED AN ON-SITE ACTION.

IN RESPONSE TO PUBLIC COMMENTS RECEIVED DURING PREVIOUS PUBLIC PARTICIPATION, EPA INTENDS FOR THE THERMAL TREATMENT UNIT AT TIMES BEACH TO BE OPERATED UNDER A RCRA/HWML PERMIT. DURING THE PUBLIC COMMENT PERIOD FOR THE TIMES BEACH PROPOSED PLAN, A PRIMARY CONCERN EXPRESSED WAS THE DESIRE TO LIMIT THE OPERATION OF THE THERMAL TREATMENT UNIT IN BOTH DURATION AND SOURCES OF MATERIALS WHICH WOULD BE TREATED. AN OPERATING PERMIT FOR THE THERMAL TREATMENT UNIT ISSUED UNDER RCRA AND THE MISSOURI HWML WOULD PROVIDE THESE LIMITS ON THE OPERATION OF THE THERMAL TREATMENT UNIT. FURTHER DISCUSSION REGARDING THE PROCEDURAL IMPACT OF THE ON-SITE DETERMINATION ON THERMAL TREATMENT AT TIMES BEACH IS INCLUDED IN THE EXPLANATION OF SIGNIFICANT DIFFERENCES FOR THE TIMES BEACH SITE (JULY 18, 1990) AND SHENANDOAH STABLES PROPOSED PLAN WHICH APPEAR IN THE SHENANDOAH STABLES ADMINISTRATIVE RECORD.

THE RESIDUES FROM AN ONSITE THERMAL TREATMENT UNIT LOCATED AT TIMES BEACH MUST BE DELISTED PRIOR TO DISPOSAL AT TIMES BEACH AS A NON-HAZARDOUS SOLID WASTE. BECAUSE THE DESIGNATED DIOXIN SITES HAVE BEEN AGGREGATED UNDER CERCLA SECTION 104(D)(4) AND THE DISPOSAL OF THOSE RESIDUES IS CONSIDERED TO BE AN ON-SITE ACTION, THE DELISTING OF THE RESIDUES IS SUBJECT TO THE PROCEDURES OF CERCLA AND THE NCP, RATHER THAN THOSE THAT WOULD APPLY UNDER RCRA. THUS, THE ADMINISTRATIVE PROCESS UNDER RCRA FOR DELISTING A WASTE -- INCLUDING A FORMAL RULEMAKING

PROCESS -- NEED NOT BE MET FOR SUPERFUND WASTES THAT WILL REMAIN ON-SITE.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA):

RCRA, AS AMENDED BY THE HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA) OF 1984, REGULATES THE GENERATION, TRANSPORTATION, TREATMENT, STORAGE, AND DISPOSAL OF HAZARDOUS WASTES AS DEFINED IN 40 CFR PART 261. THE MISSOURI HAZARDOUS WASTE MANAGEMENT LAW (HWML) AND IMPLEMENTING REGULATIONS ARE VERY SIMILAR TO THE FEDERAL RCRA PROGRAM IN ALMOST ALL RESPECTS. AS OF JULY 15, 1986, CERTAIN DIOXIN-CONTAINING WASTES ARE SPECIFICALLY REGULATED UNDER RCRA AS HAZARDOUS WASTES (THE "DIOXIN RULE," 50 FR JANUARY 14, 1985). CERTAIN REQUIREMENTS UNDER RCRA ARE CONSIDERED APPLICABLE TO THE CONTAINERIZED DIOXIN-CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE.

THE RCRA LAND DISPOSAL BAN UNDER 40 CFR PART 268 PROHIBITS LAND DISPOSAL OF DIOXIN-CONTAMINATED MATERIAL AFTER NOVEMBER 8, 1988. DUE TO A NATIONAL LACK OF TREATMENT CAPACITY, A TWO YEAR EXTENSION OF THIS DATE TO NOVEMBER 8, 1990 HAS BEEN GRANTED FOR SOIL AND DEBRIS GENERATED DURING SUPERFUND ACTIONS. THE SO- CALLED RCRA "LAND BAN" DOES NOT CONSTITUTE AN ARAR FOR ALTERNATIVES 1 AND 2 SINCE LAND DISPOSAL OF RCRA HAZARDOUS WASTES IS NOT INCLUDED IN THESE ALTERNATIVES. THE RCRA LAND BAN WILL BE COMPLIED WITH BY THE SELECTED ALTERNATIVE BY DELISTING OF THE THERMAL TREATMENT RESIDUE PRIOR TO LAND DISPOSAL.

ALTERNATIVES 2 AND 3 ARE IN COMPLIANCE WITH ALL IDENTIFIED ARARS UNDER RCRA. ALTERNATIVE 3 CAN BE IMPLEMENTED IN ACCORDANCE WITH REQUIREMENTS UNDER 40 CFR PART 264 FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES, AND 40 CFR PART 263 FOR TRANSPORTERS OF HAZARDOUS WASTE AND APPLICABLE REQUIREMENTS ADMINISTERED BY THE DEPARTMENT OF TRANSPORTATION. THE PRIMARY REQUIREMENTS TO BE MET PRIOR TO THERMAL TREATMENT OF DIOXIN-CONTAMINATED SOIL UNDER RCRA AND HWML INCLUDE DEMONSTRATION OF SIX-NINES DESTRUCTION AND REMOVAL EFFICIENCY AND DELISTING OF THE THERMAL TREATMENT RESIDUE.

COMPLIANCE WITH REQUIREMENTS UNDER 40 CFR PART 264, SUBPART I FOR THE USE AND MANAGEMENT OF CONTAINERS WOULD NOT BE MAINTAINED IF THE NO-ACTION ALTERNATIVE WERE SELECTED.

FEDERAL AND STATE WATER QUALITY CRITERIA:

FEDERAL AMBIENT WATER QUALITY CRITERIA (ESTABLISHED PURSUANT TO SECTION 303 OF THE CLEAN WATER ACT AT 40 CFR PART 120) PROVIDE AN ESTIMATE OF THE AMBIENT SURFACE WATER CONCENTRATION THAT WILL NOT RESULT IN ADVERSE HEALTH EFFECTS IN HUMANS, OR THE CONCENTRATIONS ASSOCIATED WITH CERTAIN INCREMENTAL CANCER RISKS. THE FEDERAL AND STATE AMBIENT WATER QUALITY CRITERIA FOR 2,3,7,8-TCDD IS ZERO. FEDERAL AND STATE AMBIENT WATER QUALITY CRITERIA ARE APPLICABLE TO ANY ALTERNATIVE INVOLVING WASTEWATER DISCHARGE TO SURFACE WATERS OR LAND APPLICATION IN EXCESS OF CONSUMPTIVE RATES.

RUNOFF CARRYING CONTAMINATED SOIL PARTICLES WOULD BE CONTROLLED DURING IMPLEMENTATION OF THE PREFERRED REMEDIAL ACTION IN ORDER TO ELIMINATE NON-POINT DISCHARGES.

ALTERNATIVES 1 AND 2 INVOLVE NO WASTEWATER DISCHARGE OF ANY TYPE. ALTERNATIVE 3 MAY UTILIZE WET AIR POLLUTION CONTROL SYSTEMS WHICH GENERATE WASTEWATER THAT MUST BE DISCHARGED FOLLOWING ATTAINMENT OF DELISTING CRITERIA. IN THIS EVENT, THE WASTEWATER DISCHARGE WILL BE IN COMPLIANCE WITH THE SUBSTANTIVE PROVISIONS OF THE CLEAN WATER ACT AND MISSOURI CLEAN WATER LAW.

FEDERAL AND STATE AIR POLLUTION CONTROL REQUIREMENTS:

THE FEDERAL AND MISSOURI CLEAN AIR ACTS SPECIFY AIR QUALITY STANDARDS AND REGULATE HAZARDOUS SUBSTANCE EMISSIONS FROM STATIONARY SOURCES. THE MISSOURI AIR POLLUTION CONTROL REGULATIONS, ADMINISTERED BY THE AIR CONSERVATION COMMISSION AT 10 CSR 10, REGULATE CONTAMINANT AND PARTICULATE AIR EMISSIONS FROM A VARIETY OF SOURCES. REGULATIONS UNDER RCRA (40 CFR PART 264, SUBPART O) ALSO STIPULATE EMISSION LIMITS FOR INCINERATORS.

THESE REQUIREMENTS ARE APPLICABLE TO ALTERNATIVE 3 WHICH MAY RESULT IN EMISSIONS OF FUGITIVE PARTICULATE MATTER (DUST), AND AIR EMISSIONS FROM THE THERMAL TREATMENT UNIT. DUST CONTROL MEASURES WILL BE IMPLEMENTED AS NECESSARY DURING MATERIAL HANDLING IN ORDER TO MINIMIZE THE POTENTIAL FOR GENERATION OF FUGITIVE DUST. AIR EMISSIONS WILL BE IN COMPLIANCE WITH SUBSTANTIVE REQUIREMENTS OF THE FEDERAL CLEAN AIR ACT AND MISSOURI CLEAN AIR ACT.

REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT

THIS EVALUATION CRITERIA RELATES TO THE PERFORMANCE OF A TECHNOLOGY OR REMEDIAL ALTERNATIVE IN TERMS OF ELIMINATING OR CONTROLLING RISKS POSED BY THE TOXICITY, MOBILITY, OR VOLUME OF HAZARDOUS SUBSTANCES.

ALTERNATIVE 3 INVOLVES THERMAL TREATMENT OF ALL SITE CONTAMINANTS WHICH EXCEED HEALTH-BASED LEVELS. THERMAL TREATMENT DESTROYS THE CONTAMINATION, THEREBY ELIMINATING THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS. THERMAL TREATMENT WILL RESULT IN ONLY A SLIGHT VOLUME REDUCTION OF THE SOIL MATRIX WHICH CONTAINS THE CONTAMINATION PRIOR TO TREATMENT, DUE TO DESTRUCTION OF THE ORGANIC MATTER IN THE SOIL.

ALTERNATIVES 1 AND 2 DO NOT INVOLVE TREATMENT, AND DO NOT REDUCE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS. IN THE EVENT OF STORAGE SYSTEM FAILURE RESULTING IN A RELEASE, THE VOLUME AND MOBILITY OF SITE CONTAMINANTS MAY BE INCREASED.

SHORT-TERM EFFECTIVENESS

SHORT-TERM EFFECTIVENESS ADDRESSES THE TIME TO ACHIEVE PROTECTION AND THE POTENTIAL ADVERSE IMPACTS OF ITS IMPLEMENTATION.

SHORT-TERM RISKS AT TIMES BEACH ASSOCIATED WITH THERMAL TREATMENT CAN BE EFFECTIVELY CONTROLLED THROUGH PROCESS AND EMISSIONS MONITORING. LONG-TERM PROTECTIVENESS WILL BE ACHIEVED AT THE SHENANDOAH STABLES SITE FOLLOWING TRANSPORT OF CONTAMINATED MATERIALS FROM THE SITE AND DECONTAMINATION OF THE STRUCTURES. THE SCHEDULE FOR TRANSPORT OF MATERIALS TO TIMES BEACH IS DEPENDENT UPON THE SCHEDULE FOR OPERATION OF THE TEMPORARY THERMAL TREATMENT UNIT. SHORT-TERM RISKS ASSOCIATED WITH TRANSPORTATION OF CONTAMINATED MATERIALS TO TIMES BEACH ARE DISCUSSED ABOVE.

SHORT-TERM RISKS ASSOCIATED WITH INTERIM STORAGE PRIOR TO THERMAL TREATMENT ARE THE EQUIVALENT OF SHORT-TERM RISKS ASSOCIATED WITH ALTERNATIVE 2.

ALTERNATIVES 1 AND 2 INVOLVE NO MATERIAL HANDLING OR DISTURBANCE, RESULTING IN MINIMAL SHORT-TERM IMPACTS.

LONG-TERM EFFECTIVENESS AND PERMANENCE

LONG-TERM EFFECTIVENESS AND PERMANENCE ADDRESSES THE LONG-TERM PROTECTION AND RELIABILITY AN ALTERNATIVE AFFORDS.

ALTERNATIVE 3 INVOLVES THERMAL TREATMENT, WHICH PERMANENTLY DESTROYS THE DIOXIN CONTAMINATION, PROVIDING THE HIGHEST LEVEL OF LONG-TERM PROTECTIVENESS.

ALTERNATIVES 1 AND 2 DO NOT CONSTITUTE PERMANENT REMEDIES. ALTERNATIVE 1 INVOLVES NO FURTHER ACTION AT THE SITE. WITHOUT CONTINUED MAINTENANCE OF THE STORAGE FACILITIES, THE STORAGE CONTAINERS AND BUILDINGS WOULD EVENTUALLY FAIL, RESULTING IN A RELEASE OF CONTAMINANTS INTO THE ENVIRONMENT. THIS ALTERNATIVE DOES NOT PROVIDE LONG-TERM PROTECTIVENESS. ALTERNATIVE 2 PROVIDES CONTINUED MAINTENANCE OF THE STORAGE FACILITIES, BUT FUTURE RELEASE DUE TO CATASTROPHIC FAILURE IS POSSIBLE. FURTHERMORE, WITHOUT TREATMENT TO REDUCE CONTAMINANT LEVELS, THE STORED MATERIALS WOULD CONTINUE TO BE HIGHLY TOXIC.

IMPLEMENTABILITY

IMPLEMENTABILITY ADDRESSES HOW EASY OR DIFFICULT, FEASIBLE OR INFEASIBLE, AN ALTERNATIVE WOULD BE TO CARRY OUT FROM DESIGN THROUGH CONSTRUCTION, OPERATION AND MAINTENANCE.

THERMAL TREATMENT REPRESENTS A RELATIVELY COMPLEX OPERATION, INVOLVING MANY INTERRELATED ACTIVITIES WHICH MUST BE COORDINATED IN ORDER TO EFFECTIVELY AND SAFELY DESTROY THE DIOXIN CONTAMINATION. THERMAL TREATMENT OF CONTAMINATED SOILS HAS, HOWEVER, BEEN SUCCESSFULLY DEMONSTRATED ON AT LEAST 10 FULL-SCALE PROJECTS NATIONWIDE, AND HAS BEEN SELECTED FOR IMPLEMENTATION AT MORE THAN 50 PROJECTS INVOLVING HAZARDOUS MATERIALS. PROCESS CONTROLS AND MONITORING ASSURE THAT THERMAL TREATMENT IS CONDUCTED SAFELY AND EFFECTIVELY.

ALTERNATIVES 2 INVOLVES CONTINUED MAINTENANCE OF THE STORAGE FACILITIES. THIS MAINTENANCE WILL BECOME INCREASINGLY DIFFICULT AND COSTLY AS THE STORAGE SYSTEMS REACH AND EXCEED THEIR DESIGN LIVES. ALTERNATIVE 1 INVOLVES NO ACTION, AND REQUIRES NO IMPLEMENTATION.

COST

CERCLA REQUIRES THAT EPA SELECT THE MOST COST-EFFECTIVE (NOT MERELY THE LOWEST COST) ALTERNATIVE THAT PROTECTS HUMAN HEALTH AND THE ENVIRONMENT AND MEETS OTHER REQUIREMENTS OF THE LAW.

THE TOTAL COST OF ALTERNATIVE 3 IS LARGELY DEPENDENT UPON THE ACTUAL UNIT COST OF THERMAL TREATMENT. THERMAL TREATMENT COST ESTIMATES HAVE RANGED FROM LESS THAN $200 PER CUBIC YARD TO OVER $1,000 PER CUBIC YARD. THE COST OF ANCILLARY OPERATIONS AND REQUIREMENTS SUCH AS FLOOD PROTECTION, SOIL HANDLING AND PREPARATION, AND ASH DISPOSAL ARE ADDITIONAL AND INCREASE THE TOTAL PROJECTED UNIT TREATMENT COST. THIS ALTERNATIVE OFFERS A HIGH DEGREE OF PROTECTIVENESS RELATIVE TO ITS COST.

THE COST OF ALTERNATIVE 3 HAS THE HIGHEST COST OF THE ALTERNATIVES CONSIDERED. THE ANNUAL COST OF ALTERNATIVE 2 IS RELATIVELY LOW. HOWEVER, THESE COSTS CAN BE EXPECTED TO INCREASE AS MAJOR REPAIR OF THE STORAGE FACILITIES BECOMES NECESSARY. NO COST IS ASSOCIATED WITH THE NO ACTION ALTERNATIVE.

COMMUNITY ACCEPTANCE

THIS EVALUATION CRITERIA ADDRESSES THE DEGREE TO WHICH MEMBERS OF THE LOCAL COMMUNITY SUPPORT THE REMEDIAL ALTERNATIVES BEING EVALUATED.

PUBLIC COMMENT PERIODS WERE CONDUCTED CONCURRENTLY FOR THE SHENANDOAH STABLES FEASIBILITY STUDY AND SHENANDOAH STABLES PROPOSED PLAN. NO WRITTEN COMMENTS WERE RECEIVED FROM RESIDENTS NEAR THE SHENANDOAH STABLES SITE. TWO SETS OF COMMENTS WERE RECEIVED FROM THE MAYOR AND CITY ATTORNEY OF FENTON, MISSOURI, LOCATED NEAR THE TIMES BEACH SITE. THESE WRITTEN COMMENTS EXPRESSED CONCERN ABOUT POSSIBLE ADVERSE IMPACTS OF OPERATION OF A TEMPORARY THERMAL TREATMENT UNIT AT TIMES BEACH.

DURING THE SEPTEMBER 19, 1990, PUBLIC MEETING CONDUCTED FOR THE SHENANDOAH STABLES FEASIBILITY STUDY AND PROPOSED PLAN, LOCAL RESIDENTS INDICATED SUPPORT FOR THE PROJECT. THE LINCOLN COUNTY COMMISSION ALSO EXPRESSED SUPPORT OF THE PROJECT DURING A SEPARATE MEETING CONDUCTED ON SEPTEMBER 19, 1990. ONE INDIVIDUAL AT THE SEPTEMBER 19, 1990, PUBLIC MEETING DID EXPRESS CONCERN REGARDING POTENTIAL ADVERSE IMPACTS OF OPERATING A THERMAL TREATMENT UNIT AT TIMES BEACH. WRITTEN COMMENTS WERE ALSO RECEIVED FROM THIS INDIVIDUAL.

CONSIDERABLE PUBLIC INVOLVEMENT PRECEDED THE TIMES BEACH REMEDY SELECTION WHICH ESTABLISHED TREATMENT CAPACITY AT TIMES BEACH FOR THE MATERIALS AT THE SHENANDOAH STABLES SITE. THE LOCAL COMMUNITY NEAR TIMES BEACH HAS DEMONSTRATED DIVIDED SUPPORT FOR THE VARIOUS ALTERNATIVES EVALUATED DUE TO SHORT-TERM REMEDIAL ACTION IMPACTS AND AESTHETIC IMPACTS. MANY RESIDENTS OF THE NEIGHBORING COMMUNITY OF EUREKA PERCEIVE THE IMPLEMENTATION OF ANY ONSITE DISPOSAL OR THERMAL TREATMENT ALTERNATIVE AS A THREAT TO THE ECONOMIC DEVELOPMENT AND STABILITY OF THEIR COMMUNITY. SOME EUREKA RESIDENTS PROPOSED THAT A REMEDIAL ACTION BE

IMPLEMENTED AT TIMES BEACH CONSISTING OF INSTALLATION OF AN IMPERMEABLE MEMBRANE COVERED WITH A VEGETATED SOIL LAYER.

OTHER RESIDENTS NEAR THE TIMES BEACH SITE HAVE SUPPORTED CENTRALIZED THERMAL TREATMENT OF SOILS FROM TIMES BEACH AND OTHER EASTERN MISSOURI DIOXIN SITES.

THERMAL TREATMENT CONDUCTED ONSITE AT THE SHENANDOAH STABLES PROPERTY WAS REJECTED DURING SCREENING OF POTENTIAL REMEDIAL ALTERNATIVES. IN 1983, UPON DISCOVERY OF CONTAMINATION AT THE SITE, OPERATION OF THE ONGOING BUSINESS AT THE SITE WAS ORDERED CLOSED UNTIL CONTAMINATED SOILS WERE EXCAVATED AND PLACED IN INTERIM ONSITE STORAGE. A SIGNIFICANT LOSS OF REVENUE TO THE SITE OWNER RESULTED DURING THIS EXTENDED PERIOD OF BUSINESS CLOSURE. FOLLOWING COMPLETION OF THE OPERABLE UNIT REMEDIAL ACTION IN MAY, 1989, HEALTH-BASED LEVELS WERE ACHIEVED BY EXCAVATION AND CONTAINMENT OF CONTAMINATED SOILS EXCEEDING HEALTH-BASED LEVELS, AND BUSINESS OPERATIONS WERE ALLOWED TO RESUME. ONSITE THERMAL TREATMENT AT SHENANDOAH COULD NOT BE IMPLEMENTED WITHOUT FURTHER DISRUPTION OF BUSINESS ACTIVITIES AT THE SITE.

IN ADDITION, THE SHENANDOAH STABLES FEASIBILITY STUDY ELIMINATES THIS ALTERNATIVE DURING THE SCREENING PROCESS DUE TO THE HIGH COST RELATIVE TO THERMAL TREATMENT AT A CENTRALIZED LOCATION. ECONOMIES OF SCALE ARE GAINED BY TREATING CONTAMINATED MATERIALS FROM EASTERN MISSOURI LOCATIONS AT A SINGLE CENTRALIZED SITE. COSTS ASSOCIATED WITH SITE PREPARATION, MOBILIZATION, DEMOBILIZATION, AND CLOSURE REPRESENT A SUBSTANTIAL PORTION OF THE OVERALL COST OF THE PROJECT. BY THERMALLY TREATING CONTAMINATED MATERIALS FROM A NUMBER OF SITES AT A CENTRALIZED LOCATION, THESE FIXED COSTS CAN BE DISTRIBUTED BETWEEN THE VARIOUS SITES.

STATE ACCEPTANCE

THE STATE ACCEPTANCE CRITERIA ADDRESSES THE CONCERN AND DEGREE OF SUPPORT THAT THE STATE GOVERNMENT HAS EXPRESSED REGARDING THE REMEDIAL ALTERNATIVES BEING EVALUATED.

THE STATE OF MISSOURI IS A PARTY TO A CONSENT DECREE WITH THE UNITED STATES OF AMERICA AND THE SYNTEX DEFENDANTS NAMED IN THE US V BLISS CIVIL ACTION DESCRIBED ABOVE. THIS CONSENT DECREE PROVIDES FOR A MIXED-WORK SETTLEMENT FOR THE DESIGNATED EASTERN MISSOURI DIOXIN SITES, INCLUDING SHENANDOAH STABLES. UNDER THE MIXED-WORK ARRANGEMENT, EPA, THE STATE OF MISSOURI, AND SYNTEX HAVE RESPONSIBILITIES FOR VARIOUS PORTIONS OF THE OVERALL PROJECT. THE REMEDY DESCRIBED BY THIS PROPOSED PLAN IS CONSISTENT WITH THE CONSENT DECREE, WHICH HAS BEEN APPROVED BY THE STATE OF MISSOURI.

THE SHENANDOAH STABLES PROPOSED PLAN WAS PROVIDED TO THE STATE OF MISSOURI FOR COMMENT IN ACCORDANCE WITH STATUTORY PROVISIONS OF SARA, SECTION 121(F)(1)(G). THE STATE HAS INDICATED SUPPORT OF THE SELECTED REMEDY.

#TSR
IX. THE SELECTED REMEDY

THE AGENCY HAS SELECTED ALTERNATIVE 3, THERMAL TREATMENT AT TIMES BEACH, FOR FINAL MANAGEMENT OF DIOXIN-CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE. ALTERNATIVE 3 INVOLVES TRANSPORTATION OF 3,471 CUBIC YARDS OF DIOXIN-CONTAMINATED SOILS CURRENTLY IN STORAGE AT THE SHENANDOAH STABLES SITE TO TIMES BEACH FOR THERMAL TREATMENT. THERMAL TREATMENT RESIDUES WILL BE LAND DISPOSED ONSITE IN ACCORDANCE WITH THE APPROVED DELISTING PETITION AND RCRA LAND DISPOSAL RESTRICTIONS. FOLLOWING TRANSPORT OF DIOXIN-CONTAMINATED MATERIALS TO TIMES BEACH FOR TREATMENT, THE STORAGE BUILDINGS CONSTRUCTED AT THE SHENANDOAH STABLES SITE WILL BE DECONTAMINATED AND REMOVED FROM THE SITE, IF NECESSARY. FOLLOWING REMOVAL OF THE STORAGE FACILITY, THIS PORTION OF THE SITE WOULD BE RESTORED.

#SD
X. STATUTORY DETERMINATIONS

BASED UPON AVAILABLE INFORMATION, THE SELECTED REMEDY SATISFIES THE REMEDY SELECTION REQUIREMENTS UNDER CERCLA, AS AMENDED BY SARA AND THE NATIONAL CONTINGENCY PLAN. THE REMEDY PROVIDES PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT, ACHIEVES ALL APPLICABLE OR RELEVANT

AND APPROPRIATE REQUIREMENTS, IS COST-EFFECTIVE, UTILIZES PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE, AND SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES INVOLVING TREATMENT AS A PRINCIPAL ELEMENT.

PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT

THE SELECTED REMEDY FOR THE SHENANDOAH STABLES SITE PROVIDES A HIGH DEGREE OF PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT AND PERMANENCE. NO OTHER ALTERNATIVE IDENTIFIED OFFERS AN EQUIVALENT DEGREE OF LONG-TERM PROTECTION. THE SELECTED REMEDY IS THE ONLY ALTERNATIVE IDENTIFIED WHICH PERMANENTLY ATTAINS THE LEVEL OF CLEANUP RECOMMENDED FOR SHENANDOAH STABLES BY STATE AND FEDERAL HEALTH AGENCIES.

THE PRIMARY ENVIRONMENTAL CONCERN AT THE SHENANDOAH STABLES SITE IS THE POTENTIAL RELEASE OF DIOXIN-CONTAMINATED SOIL INTO THE ENVIRONMENT AND SUBSEQUENT EXPOSURE TO ENVIRONMENTAL RECEPTORS. RELEASE OF CONTAMINATION INTO THE ENVIRONMENT IS CURRENTLY CONTROLLED BY THE INTERIM STORAGE SYSTEMS. CONTINUED MONITORING AND MAINTENANCE PENDING IMPLEMENTATION OF THE SELECTED REMEDY WILL CONTROL THE POTENTIAL FOR RELEASE. ANY SPILLS OF CONTAMINATED MATERIALS WHICH MAY OCCUR DURING TRANSPORT OF MATERIALS TO TIMES BEACH CAN BE IMMEDIATELY AND EFFECTIVELY CLEANED UP, AND THE SPILLED CONTAMINATED MATERIALS TRANSPORTED TO TIMES BEACH FOR TREATMENT. THE SELECTED REMEDY INVOLVES THERMAL TREATMENT WHICH PERMANENTLY DESTROYS THE SITE CONTAMINANTS. ONCE DESTROYED, THE POTENTIAL FOR ENVIRONMENTAL EXPOSURE IS ELIMINATED.

ATTAINMENT OF ARARS

THE SELECTED REMEDY WILL ACHIEVE THE PROVISIONS OF ALL APPLICABLE, OR RELEVANT AND APPROPRIATE REQUIREMENT (ARARS) FOR THE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT. THERMAL TREATMENT AT TIMES BEACH CAN BE PERFORMED IN COMPLIANCE WITH HAZARDOUS WASTE REQUIREMENTS UNDER RCRA AND HWML, EMISSIONS REQUIREMENTS UNDER THE FEDERAL AND STATE CLEAN AIR LAWS AND FEDERAL AND STATE CLEAN WATER LAWS, AND ALL APPLICABLE TRANSPORTATION REQUIREMENTS. PRIMARY REQUIREMENTS TO BE MET PRIOR TO THERMAL TREATMENT OF SOIL INCLUDE DEMONSTRATION OF SIX- NINES DESTRUCTION AND REMOVAL EFFICIENCY AND DELISTING OF THE THERMAL TREATMENT RESIDUE. PRIOR EXPERIENCE BY THE AGENCY WITH THE EPA MOBILE INCINERATOR IN SOUTHWEST MISSOURI AND OTHER SIMILAR PROJECTS HAS INDICATED THAT THESE REQUIREMENTS CAN BE ACHIEVED WITH COMMERCIALLY-AVAILABLE THERMAL TREATMENT TECHNOLOGIES.

PREFERENCE FOR TREATMENT

THE SELECTED REMEDY SATISFIES THE STATUTORY PREFERENCE (ESTABLISHED BY SARA) FOR REMEDIES INVOLVING TREATMENT WHICH RESULT IN THE PERMANENT REDUCTION OF THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS SUBSTANCES WHICH CONSTITUTES THE PRINCIPAL THREAT AT THE SITE. THERMAL TREATMENT DESTROYS THE DIOXIN CONTAMINATION, THEREBY ELIMINATING THE TOXICITY OF THE TREATED SOIL. SINCE THE DIOXIN CONTAMINATION IN THE TREATED SOIL IS DESTROYED, THE POTENTIAL MOBILITY OF THIS CONTAMINATION IS ALSO ELIMINATED.

COST EFFECTIVENESS

CENTRALIZED THERMAL TREATMENT OF CONTAMINATED SOILS FROM THE DESIGNATED EASTERN MISSOURI DIOXIN SITES PROVIDES SUBSTANTIAL ECONOMIES OF SCALE, RESULTING IN A COST-EFFECTIVE COMPREHENSIVE REMEDY FOR THE IDENTIFIED EASTERN MISSOURI DIOXIN SITES. ALTHOUGH THE SELECTED REMEDY HAS THE HIGHEST ASSOCIATED COST OF ANY OF THE ALTERNATIVES EVALUATED, NO OTHER REMEDIAL ALTERNATIVE PROVIDES THIS HIGH LEVEL OF PROTECTION AT A LESSER COST. IN CONSIDERATION OF THE BENEFITS PROVIDED BY THERMAL TREATMENT, THE SELECTED REMEDY HAS BEEN DETERMINED TO BE COST-EFFECTIVE.

#DSC
XI. DOCUMENTATION OF SIGNIFICANT CHANGES

THE EPA HAS SELECTED A REMEDY CONSISTING OF TREATMENT OF DIOXIN-CONTAMINATED SOIL AT A TEMPORARY THERMAL TREATMENT FACILITY TO BE OPERATED AT TIMES BEACH. THIS SELECTED REMEDY IS IDENTICAL TO THE REMEDY PROPOSED IN THE PROPOSED PLAN OF AUGUST 24, 1990.

#RS

RESPONSIVENESS SUMMARY

THIS DOCUMENT ADDRESSES ALL COMMENTS RECEIVED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) DURING THE PUBLIC COMMENT PERIOD CONDUCTED AS PART OF THE REMEDY SELECTION PROCESS FOR THE FINAL OPERABLE UNIT FOR THE SHENANDOAH STABLES SITE.

INTRODUCTION

ON AUGUST 24, 1990, EPA RELEASED THE FEASIBILITY STUDY FOR THE SHENANDOAH STABLES SITE AND THE PROPOSED PLAN FOR FINAL MANAGEMENT OF DIOXIN-CONTAMINATED SOIL, SHENANDOAH STABLES, LINCOLN COUNTY, MISSOURI FOR PUBLIC COMMENT. ACCORDING TO THE PROPOSED PLAN FOR THE FINAL MANAGEMENT OF DIOXIN-CONTAMINATED MATERIALS AT THE SHENANDOAH STABLES SITE, MATERIALS CONTAINERIZED AND PLACED IN INTERIM ONSITE STORAGE DURING A PREVIOUS RESPONSE ACTION (OPERABLE UNIT NO. 1) WOULD BE TRANSPORTED TO TIMES BEACH FOR THERMAL TREATMENT. FOLLOWING TRANSPORT OF CONTAINERIZED MATERIALS FROM THE SITE, THE STORAGE STRUCTURES WOULD BE DECONTAMINATED AND REMOVED. PORTIONS OF THE SITE DISTURBED BY THE REMEDIAL ACTION WOULD BE RESTORED.

PUBLIC PARTICIPATION

PUBLIC COMMENTS REGARDING THE SHENANDOAH STABLES FEASIBILITY STUDY AND PROPOSED PLAN WERE ACCEPTED BY THE AGENCY FROM AUGUST 24, 1990 THROUGH SEPTEMBER 24, 1990. IN ADDITION, A PUBLIC MEETING WAS CONDUCTED AT 7:30 P.M., SEPTEMBER 19, 1990 AT THE MOSCOW MILLS COMMUNITY CENTER TO PRESENT THE FEASIBILITY STUDY AND PROPOSED PLAN AND ACCEPT PUBLIC COMMENT. DURING THE PUBLIC MEETING, WRITTEN MATERIALS WERE SUBMITTED FOR THE RECORD BY ONE ATTENDEE. THESE MATERIALS HAVE BEEN REVIEWED BY EPA AND INCLUDED IN THE ADMINISTRATIVE RECORD. A TRANSCRIPT OF THE PUBLIC MEETING HAS ALSO BEEN PREPARED AND PLACED IN THE ADMINISTRATIVE RECORD.

DURING THE PUBLIC COMMENT PERIOD, TWO SETS OF WRITTEN COMMENTS WERE RECEIVED BY THE AGENCY. THESE COMMENTS HAVE BEEN ADDED TO THE ADMINISTRATIVE RECORD FOR THIS SITE. THIS RESPONSIVENESS SUMMARY HAS BEEN PREPARED TO ADDRESS THESE COMMENTS.

THIS RESPONSIVENESS SUMMARY REPRESENTS A COMPONENT OF THE RECORD OF DECISION (ROD) PACKAGE, WHICH ALSO INCLUDES THE ROD DECLARATION, ROD SUMMARY, AND INDEX TO THE ADMINISTRATIVE RECORD. FORMAL SELECTION OF THE FINAL MANAGEMENT ALTERNATIVE TO BE IMPLEMENTED AT THE SHENANDOAH STABLES SITE OCCURS BY SIGNATURE OF THE ROD DECLARATION BY THE REGIONAL ADMINISTRATOR FOR EPA REGION 7.

WRITTEN COMMENTS RECEIVED FROM THE PUBLIC

MANY OF THE WRITTEN COMMENTS RECEIVED BY THE AGENCY DEALT WITH THE USE OF THE TEMPORARY THERMAL TREATMENT UNIT AT TIMES BEACH TO TREAT DIOXIN-CONTAMINATED MATERIALS FROM THE SHENANDOAH STABLES SITE. THE DECISION THAT THE TIMES BEACH THERMAL TREATMENT UNIT WOULD BE AVAILABLE TO TREAT MATERIALS FROM THE SHENANDOAH STABLES SITE WAS INCLUDED IN THE SEPTEMBER 29, 1988, RECORD OF DECISION FOR THE TIMES BEACH SITE. THE AVAILABILITY OF THE THERMAL TREATMENT UNIT AT TIMES BEACH TO TREAT MATERIALS FROM OTHER DESIGNATED EASTERN MISSOURI DIOXIN SITES, INCLUDING SHENANDOAH STABLES, WAS ESTABLISHED DURING THE 1988 REMEDY SELECTION PROCESS. MANY OF THE COMMENTS RECEIVED BY THE AGENCY, THEREFORE, DO NOT PERTAIN TO THE IMMEDIATE REMEDY SELECTION UNDER CONSIDERATION FOR THE SHENANDOAH STABLES SITE. NEVERTHELESS, RESPONSES WILL BE PROVIDED TO THESE COMMENTS IN INSTANCES WHERE SIMILAR COMMENTS WERE NOT RECEIVED DURING THE PUBLIC COMMENT PERIOD PRECEDING ISSUANCE OF THE TIMES BEACH RECORD OF DECISION.

TWO COMMENT LETTERS WERE RECEIVED DURING THE PUBLIC COMMENT PERIOD. INDIVIDUAL COMMENTS AND THE AGENCY'S RESPONSES TO THESE COMMENTS FOLLOW:

COMMENT: "THE PUBLIC HEARING ON THIS MATTER WAS NOT WIDELY ADVERTISED."

RESPONSE: ON SEPTEMBER 12, 1990, AN ANNOUNCEMENT OF THE SEPTEMBER 19, 1990, PUBLIC MEETING

WAS DIRECTLY MAILED TO ALL PARTIES LISTED IN THE SHENANDOAH STABLES COMMUNITY RELATIONS PLAN. THIS LIST INCLUDES AREA RESIDENTS, LOCAL OFFICIALS, STATE AND FEDERAL LEGISLATORS, AREA NEWSPAPERS, AND AREA TELEVISION AND RADIO STATIONS. EPA BELIEVES THAT SUFFICIENT NOTICE WAS PROVIDED PRIOR TO THE PUBLIC MEETING.

COMMENT: "THERE HAS BEEN NO COST-BENEFIT ANALYSIS OF ANY ALTERNATIVES TO BURNING DIOXIN AT TIMES BEACH."

RESPONSE: THE EVALUATION OF ALTERNATIVES PERFORMED IN THE FEASIBILITY STUDIES PREPARED FOR THE TIMES BEACH AND SHENANDOAH STABLES SITES INCLUDED A COST ANALYSIS. THE COST ANALYSES PERFORMED IN THESE STUDIES DID CONSIDER ALTERNATIVES TO THERMAL TREATMENT OF DIOXIN-CONTAMINATED MATERIALS FROM DESIGNATED EASTERN MISSOURI SITES AT TIMES BEACH. THE AGENCY HAS DETERMINED THAT THE SELECTED REMEDY FOR THE SHENANDOAH STABLES SITE IS COST-EFFECTIVE.

COMMENT: "--NO INCINERATION AT TIMES BEACH OF DIOXIN FROM OTHER AREAS;"

RESPONSE: THE AVAILABILITY OF THE TIMES BEACH THERMAL TREATMENT UNIT TO TREAT DIOXIN-CONTAMINATED SOILS FROM A DESIGNATED GROUP OF EASTERN MISSOURI SITES WAS ESTABLISHED BY THE SEPTEMBER 29, 1988, TIMES BEACH RECORD OF DECISION. THE AGENCY ADDRESSED THIS ISSUE EXTENSIVELY DURING THE PUBLIC COMMENT PERIOD PRIOR TO ISSUANCE OF THE TIMES BEACH RECORD OF DECISION. THE AGENCY'S RESPONSE TO THIS COMMENT IS PRESENTED IN THE SEPTEMBER 28, 1988, TIMES BEACH RESPONSIVENESS SUMMARY. THIS DOCUMENT HAS BEEN INCLUDED IN THE ADMINISTRATIVE RECORD FILE FOR THE SHENANDOAH STABLES SITE.

COMMENT: "...NO ILLEGAL USE OF THE FLOODPLAIN;"

RESPONSE: A RING LEVEE WILL BE CONSTRUCTED TO PROTECT THE TEMPORARY THERMAL TREATMENT UNIT FROM FLOODING. IMPLEMENTATION OF THE REMEDY AT TIMES BEACH IS NOT ILLEGAL. THE SELECTED REMEDIES FOR TIMES BEACH AND THE SHENANDOAH STABLES SITE COMPLY WITH CERCLA AND ALL APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL AND STATE REQUIREMENTS (ARARS).

COMMENT: "...NO AGREEMENTS CONSUMMATED BEHIND CLOSED DOORS;...NO MORE DECEITFUL GOVERNMENT GESTURES."

RESPONSE: REMEDY SELECTION FOR FINAL MANAGEMENT OF DIOXIN-CONTAMINATED MATERIALS FROM EASTERN MISSOURI HAS BEEN, AND WILL CONTINUE TO BE, SUBJECT TO PUBLIC PARTICIPATION REQUIREMENTS UNDER THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED, AND THE NATIONAL CONTINGENCY PLAN.

A PUBLIC COMMENT PERIOD FOR THE SHENANDOAH STABLES FEASIBILITY STUDY AND PROPOSED PLAN WAS CONDUCTED FROM AUGUST 24, 1990 THROUGH SEPTEMBER 24, 1990. A PUBLIC MEETING WAS HELD SEPTEMBER 19, 1990, AT THE MOSCOW MILLS COMMUNITY CENTER TO DISCUSS THESE DOCUMENTS.

THE PUBLIC WAS ALSO AFFORDED AN OPPORTUNITY TO PROVIDE COMMENTS REGARDING THE CONSENT DECREE BETWEEN THE FEDERAL AND STATE GOVERNMENTS AND SYNTEX ENTITIES FOR THE DESIGNATED EASTERN MISSOURI SITES. THIS PUBLIC COMMENT PERIOD BEGAN ON AUGUST 8, 1990, AND CLOSED SEPTEMBER 7, 1990.

COMMENT: "...NO POLLUTION OF OUR WATER SUPPLY AND AIR;"

RESPONSE: THE AGENCY HAS PREVIOUSLY PROVIDED A RESPONSE TO THIS COMMENT IN THE SEPTEMBER 28, 1988, TIMES BEACH RESPONSIVENESS SUMMARY. THIS DOCUMENT HAS BEEN INCLUDED IN THE ADMINISTRATIVE RECORD FILE FOR THE SHENANDOAH STABLES SITE. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS A THRESHOLD CRITERIA FOR REMEDIAL ACTIONS UNDER CERCLA. THE REMEDY SELECTED FOR THE SHENANDOAH STABLES SITE IS PROTECTIVE. A COMPONENT OF THE SELECTED REMEDY INVOLVES THERMAL TREATMENT OF CONTAMINATED SOILS. AIR POLLUTION CONTROL EQUIPMENT AND MEASURES TAKEN TO CONTROL WASTEWATER EMISSIONS FROM THE THERMAL TREATMENT UNIT WILL ASSURE THAT NO RELEASE OF CONTAMINANTS OCCURS WHICH ENDANGERS PUBLIC HEALTH AND THE ENVIRONMENT.

COMMENT: "...NO STIGMA FOR OUR AREA"

RESPONSE: THE REMEDY SELECTED FOR TIMES BEACH IS INTENDED TO REMOVE THE STIGMA OF A HAZARDOUS WASTE SITE FROM THE AREA. ONCE THE DIOXIN CONTAMINATION IS DESTROYED, THE ABANDONED STRUCTURES AND DEBRIS ARE DISPOSED OF, AND THE AREA IS RESTORED, THIS STIGMA CAN AND WILL BE REMOVED FROM TIMES BEACH AND THE EASTERN MISSOURI DIOXIN SITES.

COMMENT: "...NO MORE DECISIONS TO SERVE SYNTEX AND NOT THE RESIDENTS;"

RESPONSE: SYNTEX ENTITIES ARE POTENTIALLY RESPONSIBLE PARTIES THAT ARE SIGNATORIES TO A CONSENT DECREE LODGED WITH FEDERAL COURT FOR A COMPREHENSIVE CLEANUP OF EASTERN MISSOURI DIOXIN SITES. THIS CONSENT DECREE IS INDEPENDENT OF THE AGENCY'S REMEDY SELECTION PROCESS. THE CONSENT DECREE PARTIALLY RESOLVES CIVIL LITIGATION PENDING SINCE JANUARY, 1984, IN THE FEDERAL DISTRICT COURT FOR THE EASTERN DISTRICT OF MISSOURI. THE REMEDY SELECTED IN THE TIMES BEACH RECORD OF DECISION AND THE REMEDY PRESENTED IN THE SHENANDOAH STABLES PROPOSED PLAN DO NOT SERVE THE INTERESTS OF SYNTEX. IF THE REMEDY AS SET FORTH IN THE CONSENT DECREE IS IMPLEMENTED, SYNTEX WILL INCUR CONSIDERABLE EXPENSE IN PERFORMING ASPECTS OF THE CLEANUP WHICH ARE THEIR RESPONSIBILITY UNDER THE DECREE.

COMMENT: REMEDY SELECTION FOR THE TIMES BEACH SITE SHOULD BE DEFERRED UNTIL ADDITIONAL TECHNOLOGY DEVELOPS.

RESPONSE: THIS COMMENT PERTAINS TO THE 1988 TIMES BEACH REMEDY SELECTION. THE COMMENTOR IS REFERRED TO THE SEPTEMBER 28, 1988, TIMES BEACH RESPONSIVENESS SUMMARY INCLUDED IN THE ADMINISTRATIVE RECORD. AS EXPLAINED IN THE TIMES BEACH RESPONSIVENESS SUMMARY, THERE IS NO ASSURANCE THAT AN ALTERNATE TECHNOLOGY CAPABLE OF ACHIEVING THE CLEANUP GOALS WILL BE IDENTIFIED IN THE NEAR FUTURE. THE STORAGE FACILITIES ARE NOT DESIGNED TO PERFORM INDEFINITELY. THERMAL TREATMENT REPRESENTS A SAFE, RELIABLE, AND EFFECTIVE SOLUTION TO THE EASTERN MISSOURI DIOXIN PROBLEM.

COMMENT: "THE PROPOSED PLAN PLACES TOO GREAT AN EMPHASIS ON THE COST EFFECTIVENESS AS OPPOSED TO THE ECONOMIC EFFECT ON LOCAL COMMUNITIES."

RESPONSE: REMEDY SELECTION AT THE SHENANDOAH STABLES SITE IS SUBJECT TO REQUIREMENTS OF CERCLA AND THE NATIONAL CONTINGENCY PLAN. REMEDIAL ALTERNATIVES ARE EVALUATED IN TERMS OF NINE SPECIFIED CRITERIA. COST IS INCLUDED AMONG THESE CRITERIA. IN ADDITION, THE AGENCY MUST MAKE THE DETERMINATION THAT THE SELECTED REMEDY IS COST-EFFECTIVE. THE SELECTED REMEDY AT THE SHENANDOAH STABLES SITE MEETS THE REQUIREMENTS AND GOALS OF CERCLA AND THE NATIONAL CONTINGENCY PLAN.

COMMENT: "THE PROPOSED PLAN DOES NOT HAVE AS ITS PRINCIPAL CONCERN PUBLIC SAFETY."

RESPONSE: ONE OF TWO THRESHOLD CRITERIA CONSIDERED IN THE CERCLA REMEDY SELECTION PROCESS IS PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THE SECOND THRESHOLD CRITERION CONSISTS OF COMPLIANCE WITH ARARS. THESE TWO CRITERIA ARE THE PRINCIPAL CONSIDERATIONS DURING THE REMEDY SELECTION PROCESS, AND MUST BE ATTAINED FOR ALL CERCLA REMEDIES. THESE CRITERIA ARE ACHIEVED BY THE REMEDY SELECTED FOR THE SHENANDOAH STABLES SITE.

COMMENT: "THE PROPOSED PLAN DISTURBS DIOXIN THAT IS ISOLATED AND CONTAINED, AND MOVES IT TO TIMES BEACH."

RESPONSE: TRANSPORT OF DIOXIN-CONTAMINATED MATERIALS FROM THE SHENANDOAH STABLES SITE TO TIMES BEACH WILL INVOLVE LOADING OF THE CONTAINERIZED MATERIALS CURRENTLY IN STORAGE BUILDINGS ONTO TRUCKS AND TRANSPORTATION TO TIMES BEACH. PRECAUTIONS WILL BE TAKEN DURING THE LOADING AND TRANSPORT OPERATIONS TO CONTROL THE POTENTIAL FOR SPILLAGE OF CONTAMINATED MATERIALS. IN THE EVENT OF A SPILL OF CONTAMINATED MATERIALS, EMERGENCY RESPONSE PERSONNEL WILL IMMEDIATELY CONTAIN THE SPILLED MATERIAL AND RECONTAINERIZE THE SPILLED MATERIAL FOR TRANSPORT TO TIMES BEACH. THIS CONSIDERATION WAS INCLUDED IN THE SHORT-TERM EFFECTIVENESS EVALUATION PERFORMED DURING THE REMEDY SELECTION PROCESS. REMOVAL OF THE CONTAINERIZED MATERIALS IN TEMPORARY STORAGE AT THE SHENANDOAH STABLES SITE WILL NOT ENDANGER PUBLIC HEALTH

OR THE ENVIRONMENT.

COMMENT: "THE PROPOSED PLAN BRINGS MORE DIOXIN INTO A HEAVILY POPULATED ECONOMIC GROWTH CENTER."

RESPONSE: THIS COMMENT PERTAINS TO THE 1988 REMEDY SELECTION FOR THE TIMES BEACH SITE. THE COMMENTOR IS REFERRED TO THE SEPTEMBER 28, 1988, TIMES BEACH RESPONSIVENESS SUMMARY INCLUDED IN THE ADMINISTRATIVE RECORD.

EPA ACKNOWLEDGES THAT THE REMEDY SELECTED IN THE 1988 TIMES BEACH RECORD OF DECISION POTENTIALLY BRINGS DIOXIN-CONTAMINATED MATERIALS FROM DESIGNATED EASTERN MISSOURI SITES TO TIMES BEACH FOR THERMAL TREATMENT. HOWEVER, AS EXPLAINED IN THE 1988 TIMES BEACH RECORD OF DECISION, THE SELECTED REMEDY BEST SATISFIES THE STATUTORY AND REGULATORY GOALS AND REQUIREMENTS OF CERCLA AND THE NATIONAL CONTINGENCY PLAN. THE AGENCY BELIEVES THAT THE REMEDY CAN BE IMPLEMENTED SAFELY.

COMMENT: "TRANSPORTING DIOXIN FROM OTHER SITES TO TIMES BEACH WILL CONSTITUTE MAJOR TRAFFIC AND HEALTH HAZARDS."

RESPONSE: THIS COMMENT PERTAINS TO THE 1988 TIMES BEACH REMEDY SELECTION. THE COMMENTOR IS REFERRED TO THE SEPTEMBER 28, 1988, TIMES BEACH RESPONSIVENESS SUMMARY INCLUDED IN THE ADMINISTRATIVE RECORD.

AS INDICATED DURING THE PUBLIC MEETING PRECEDING THE 1988 TIMES BEACH RECORD OF DECISION, HAUL ROUTES FOR ANY MATERIALS TRANSPORTED TO TIMES BEACH WILL BE DESIGNATED ON THE BASIS OF A TRANSPORTATION STUDY. THIS TRANSPORTATION STUDY EVALUATES THE CHARACTERISTICS OF ALTERNATE ROUTES FROM EACH OF THE EASTERN MISSOURI DIOXIN SITES TO TIMES BEACH. IN ADDITION, SAFETY MEASURES WILL BE TAKEN DURING TRANSPORTATION OPERATIONS TO ASSURE THAT HEALTH HAZARDS ARE NOT CREATED. TRAFFIC HAZARDS WILL BE CONTROLLED THROUGH ROUTE SELECTION AND TRANSPORT DURING NON-PEAK HOURS.

COMMENT: "THE FACT THAT TIMES BEACH IS IN THE FLOOD PLAIN MAKES IT AN INAPPROPRIATE SITE TO:

A. TRANSPORT DIOXIN-CONTAMINATED SOIL FROM OTHER SITES;
B. STORE DIOXIN-CONTAMINATED SOIL FROM OTHER SITES; AND
C. OPERATE AN INCINERATOR."

RESPONSE: THIS COMMENT PERTAINS TO THE 1988 TIMES BEACH REMEDY SELECTION. THE COMMENTOR IS REFERRED TO THE SEPTEMBER 28, 1988 TIMES BEACH RESPONSIVENESS SUMMARY INCLUDED IN THE ADMINISTRATIVE RECORD. THE THERMAL TREATMENT UNIT, AND ANCILLARY OPERATIONS SUCH AS THE SOIL STAGING AREA, WILL BE PROTECTED FROM FLOODING BY A RING LEVEE CONSTRUCTED PRIOR TO MOBILIZATION.

COMMENT: "WE REQUEST THAT THE EPA IN THE ROD DEMONSTRATE THE PARTICIPATION OR LEVEL THEREOF OF LOCAL COMMUNITIES AS REQUIRED BY THE NCP, IN PARTICULAR WITH REFERENCE TO THE CONFIDENTIALITY AGREEMENT."

RESPONSE: PUBLIC PARTICIPATION THAT OCCURRED DURING THE SHENANDOAH STABLES REMEDY SELECTION PROCESS FOR FINAL MANAGEMENT OF DIOXIN-CONTAMINATED MATERIALS IS DESCRIBED IN THE RECORD OF DECISION FOR THE SHENANDOAH STABLES SITE AND FURTHER DESCRIBED IN THIS RESPONSIVENESS SUMMARY.

THE CONFIDENTIALITY AGREEMENT MENTIONED IN THE COMMENT IS AN APPARENT REFERENCE TO THE AGREEMENT WHICH WAS ENTERED INTO BETWEEN THE FEDERAL, STATE, AND LOCAL GOVERNMENTS AND POTENTIALLY RESPONSIBLE PARTIES DURING SETTLEMENT NEGOTIATIONS RELATED TO LITIGATION ON THE EASTERN MISSOURI DIOXIN SITES. THESE SETTLEMENT NEGOTIATIONS ARE INDEPENDENT OF THE CERCLA REMEDY SELECTION PROCESS. THESE SETTLEMENT NEGOTIATIONS DID NOT INVOLVE SELECTION OF A REMEDY, BUT RATHER CONCERNED THE IMPLEMENTATION OF THE EPA-SELECTED REMEDIES TO CLEAN UP THE EASTERN MISSOURI DIOXIN SITES AND RETURN THEM TO BENEFICIAL USE.

COMMENT: WE REQUEST THE EPA FULLY DIRECT THEIR CONSIDERATION OF DECHLORINATION IN GENERAL AND THE APEG-PLUS PROCESS IN PARTICULAR AS A PROPOSED REMEDIAL ACTION.

RESPONSE: DURING THE REMEDY SELECTION PROCESS FOR TIMES BEACH, ALTERNATIVE TECHNOLOGIES WERE CONSIDERED FOR TREATMENT OF DIOXIN-CONTAMINATED MATERIALS IN EASTERN MISSOURI. THE APEG TECHNOLOGY IS AMONG THE TECHNOLOGIES EVALUATED IN THE TIMES BEACH FEASIBILITY STUDY, RELEASED DECEMBER 14, 1986. AT THE TIME OF THE TIMES BEACH REMEDY SELECTION, EPA MADE THE DETERMINATION THAT THERMAL TREATMENT WAS THE ONLY FULL-SCALE TECHNOLOGY THAT HAD DEMONSTRATED THE CAPABILITY OF SAFE, RELIABLE AND COMPLETE DIOXIN DESTRUCTION IN CONTAMINATED SOILS.

SINCE THE ISSUANCE OF THE TIMES BEACH RECORD OF DECISION, EPA HAS CONTINUED TO EVALUATE EMERGING TECHNOLOGIES FOR DIOXIN DESTRUCTION. THE APEG-PLUS PROCESS IS A TYPE OF CHEMICAL DECHLORINATION PROCESS THAT HAS DEMONSTRATED EFFECTIVENESS FOR CERTAIN WASTE STREAMS DURING THE PAST SEVERAL YEARS. INCLUDED IN THE SHENANDOAH STABLES ADMINISTRATIVE RECORD ARE DOCUMENTS FURTHER DESCRIBING THESE PROCESSES. TO DATE, CHEMICAL DECHLORINATION PROCESSES HAVE NOT DEMONSTRATED THE ABILITY TO RELIABLY DESTROY DIOXIN-CONTAMINATED MATERIALS SIMILAR IN VOLUME AND NATURE TO THE CONTAMINATED MATERIALS FROM THE EASTERN MISSOURI DIOXIN SITES.

DURING THE REMEDY SELECTION PROCESS FOR THE SHENANDOAH STABLES SITE, EPA HAS DETERMINED, IN CONSIDERATION OF INFORMATION REPORTED SINCE 1988 CONCERNING THE PERFORMANCE OF CHEMICAL DECHLORINATION PROCESSES, THAT THERMAL TREATMENT REMAINS THE ONLY TREATMENT TECHNOLOGY WHICH IS CAPABLE OF SAFE, RELIABLE, AND COMPLETE DESTRUCTION OF DIOXIN IN THE EASTERN MISSOURI CONTAMINATED SOILS. THERMAL TREATMENT BEST SATISFIES THE REMEDY SELECTION CRITERIA UNDER CERCLA AND THE NATIONAL CONTINGENCY PLAN, AND ATTAINS THE STATUTORY MANDATES AND GOALS OF CERCLA.

THE NON-HOMOGENEITY OF THE EASTERN MISSOURI DIOXIN-CONTAMINATED MATERIALS IS A PRIMARY CONSIDERATION IN THE SELECTION OF TREATMENT TECHNOLOGY. IN ADDITION TO THE DIFFERENT SOIL TYPES WHICH HAVE BECOME CONTAMINATED THROUGHOUT EASTERN MISSOURI, A SUBSTANTIAL VOLUME OF NON-SOIL MATERIAL HAVE ALSO BECOME CONTAMINATED AND WILL REQUIRE TREATMENT. THESE MATERIALS INCLUDE CONCRETE, WOOD, STEEL, RUBBER TIRES, PLASTICS, AND FABRICS. FULL-SCALE CHEMICAL DECHLORINATION PROCESSES HAVE NOT BEEN EFFECTIVELY DEMONSTRATED ON WASTE STREAMS AS VARIED AS THE EASTERN MISSOURI DIOXIN-CONTAMINATED MATERIALS.

FEDERAL LAWS AND REGULATIONS CONTROL THE DISPOSAL OF SPECIFIED HAZARDOUS WASTES WHICH APPEAR ON A NUMBER OF LISTS IN THE FEDERAL REGULATIONS. DIOXIN-CONTAMINATED SOILS FROM THE EASTERN MISSOURI DIOXIN SITES CONSTITUTE A LISTED HAZARDOUS WASTE. ALL TREATMENT TECHNOLOGIES WHICH COULD BE USED TO REDUCE THE TOXICITY OF THESE MATERIALS WILL UNAVOIDABLY PRODUCE A TREATMENT RESIDUE. BEFORE A RESIDUE FROM THE TREATMENT OF A LISTED HAZARDOUS WASTE CAN BE LAND DISPOSED AS A NON-HAZARDOUS SOLID WASTE, IT MUST BE "DELISTED". DELISTING INVOLVES A DEMONSTRATION THROUGH TESTING THAT THE MATERIAL NO LONGER CONTAINS HAZARDOUS CONSTITUENTS AND DOES NOT DISPLAY HAZARDOUS CHARACTERISTICS.

AN IMPORTANT CONSIDERATION IN THE DECISION TO SELECT THERMAL TREATMENT IS THE DEMONSTRATED ABILITY OF THIS TECHNOLOGY TO ATTAIN DELISTING LEVELS. THERMAL TREATMENT HAS ATTAINED DELISTING LEVELS FOR WASTE STREAMS SIMILAR TO THE DIFFERENT TYPES OF DIOXIN-CONTAMINATED MATERIALS IN EASTERN MISSOURI. FOLLOWING THERMAL TREATMENT OF EASTERN MISSOURI DIOXIN-CONTAMINATED MATERIALS, EPA ANTICIPATES THAT THE TREATMENT RESIDUE CAN BE DELISTED AND LAND-DISPOSED ON-SITE AT TIMES BEACH AS A NON- HAZARDOUS SOLID WASTE.

CHEMICAL DECHLORINATION HAS NOT EFFECTIVELY DEMONSTRATED THAT DELISTING LEVELS CAN BE CONSISTENTLY ACHIEVED FOR MATERIALS SIMILAR IN NATURE TO THE EASTERN MISSOURI DIOXIN-CONTAMINATED MATERIALS. IF DELISTING CAN NOT BE ACHIEVED, THE TREATMENT RESIDUES MUST BE SUBSEQUENTLY MANAGED AT A HAZARDOUS WASTE FACILITY WHICH IS PERMITTED FOR DIOXIN WASTES. THERE CURRENTLY ARE NO FACILITIES IN THE COUNTRY WHICH HAVE BEEN ISSUED THE NECESSARY PERMITS TO RECEIVE DIOXIN WASTES. REGARDLESS OF THE LACK OF PERMITTED FACILITIES, OFFSITE DISPOSAL OF HAZARDOUS TREATMENT RESIDUE WOULD SUBSTANTIALLY INCREASE THE COST OF THE PROJECT.